

Bull. Natn. Sci. Mus., Tokyo, Ser. A, 20 (1), pp. 51–58, March 22, 1994

Chironomids of the Subfamily Diamesinae (Diptera, Chironomidae) from Japan

II. *Sympotthastia* PAGAST, 1947

By

Eugeniy A. MAKARCHENKO

Institute of Biology and Pedology, Far East Branch of Russian
Academy of Sciences, Vladivostok, 690022 Russia

Abstract Male and pupa of *Sympotthastia gemmaformis* sp. nov. are described from Hokkaido (Japan) and Sakhalin (Russia). The male of *Sympotthastia takatensis* (TOKUNAGA), comb. nov. is briefly redescribed. The genus *Sympotthastia* PAGAST is recorded for the first time from Japan.

Key words: Diptera; Chironomidae; Diamesinae; *Sympotthastia*; taxonomy; morphology; distribution.

Introduction

The genus *Sympotthastia* PAGAST, 1947, is distributed in the Holarctic Region and comprises eight described species, namely, *diastena* (SUBLETTE), *fulva* (JOHANNSEN), *huldeni* TUISKUNEN, *khorensis* MAKARCHENKO, *macrocera* SERRA-TOSIO, *repentina* MAKARCHENKO, *spinifera* SERRA-TOSIO, *zavreli* PAGAST (SERRA-TOSIO, 1968; DOUGHMAN, 1985; MAKARCHENKO, 1985; TUISKUNEN, 1986). However, there is no record of this genus from Japan.

In 1936, TOKUNAGA described *takatensis* and placed this species in *Syndiamesa* because the genus *Sympotthastia* was not known yet. Later, from Russian part of the Far East (Amur River basin) was described *Sympotthastia khorensis* MAKARCHENKO, 1985. At that time, however, the present author had no opportunity to examine TOKUNAGA's collection of the Diamesinae and the name *khorensis* was used before the present paper. Recently, after revising Japanese Diamesinae specimens, it became possible to compare some species from Japan with those from the Russian Far East. It was found that *takatensis* must be placed in *Sympotthastia* and that *S. khorensis* was a junior synonym of *S. takatensis*.

Below I am describing a new species, *S. gemmaformis* sp. nov., and briefly re-describing *S. takatensis* on its male hypopygium, because SASA and KAWAI (1985) redescribed in detail male and female of this species from Japan.

The terminology follows SAETHER (1980). Material was fixed in 70% ethanol.

Genus *Sympotthastia* PAGAST

Sympotthastia PAGAST, 1947, Arch. Hydrobiol., **41**: 457. — SERRA-TOSIO, 1968, Trav. Lab. Hydrobiol. Piscic. Univ. Grenoble, **59-60**: 129-130. — OLIVER, 1983, Ent. scand. Suppl., **19**: 119. — DOUGHMAN, 1985, Brimleyana, **11**: 40-43. — MAKARCHENKO, 1985, DVNC AN SSSR Press, Vladivostok, 56-57. — OLIVER, 1986, Ent. scand. Suppl., **28**: 127; OLIVER, 1989, Ent. scand. Suppl., **34**: 140.

Male. Body length 4-7 mm. Generally color brown and dark brown. Eyes bare and reniform, with slight dorsomedial extension. Clypeus with and without setae. Coronals and postorbitals present; outer verticals few, extending only to top of eye; inner verticals and orbital setae absent. Antenna with 13 plumose flagellomeres, subapical part of last flagellomere with a group of light and short setae and with one subapical seta. $AR=1.6-4.26$. Second and third maxillary palpal segments partially fused, third segment with apical strongly sclerotized, semicircular projection. Antepnotum with medial commissure closed under scutal process, only ventrolateral setae present. Acrostichals absent; dorsocentrals uniserial at mid-thorax but otherwise multi-serial; prealars in two groups, ending above median anepisternum II. Wing macrotrichia absent, microtrichia visible at $\times 400$; setae on R_{4+5} usually absent. Ta_4 cylindrical and shorter or longer than Ta_5 . Anal point of hypopygium absent and if present, short and weakly sclerotized. In the last case, anal point length variable and sometimes anal point seta-like. Median volsella (MVo) clavate and setigerous; superior volsella (SVo) a strongly sclerotized and curved band. Proximal half of inferior volsella (IVo) with a pile of microtrichia and distal half with short, perpendicular setae and ending slightly free of gonocoxite. Gonostylus with two strong perpendicular setae standing just proximal to macrosetae.

Pupa. Length 5-7 mm. Generally color yellowish or brownish. Thorax weakly smooth. Dorsocentral setae simple, thoracal horn usually absent, if present, tubercle-like; middle precorneal seta (Pc2) longest; Pc2 forked into two branches. Tergite I and sternite I without shagreen of spinules. D-setae small, dispersed and simple. L-setae long and usually apically forked or divided into more than two branches. Anal lobe with short (25-105 μm), light and tender fringe of hair-like setae in two or three rows. Each lobe with a terminal, tooth-like ventral tubercle near the last one of the three anal macrosetae.

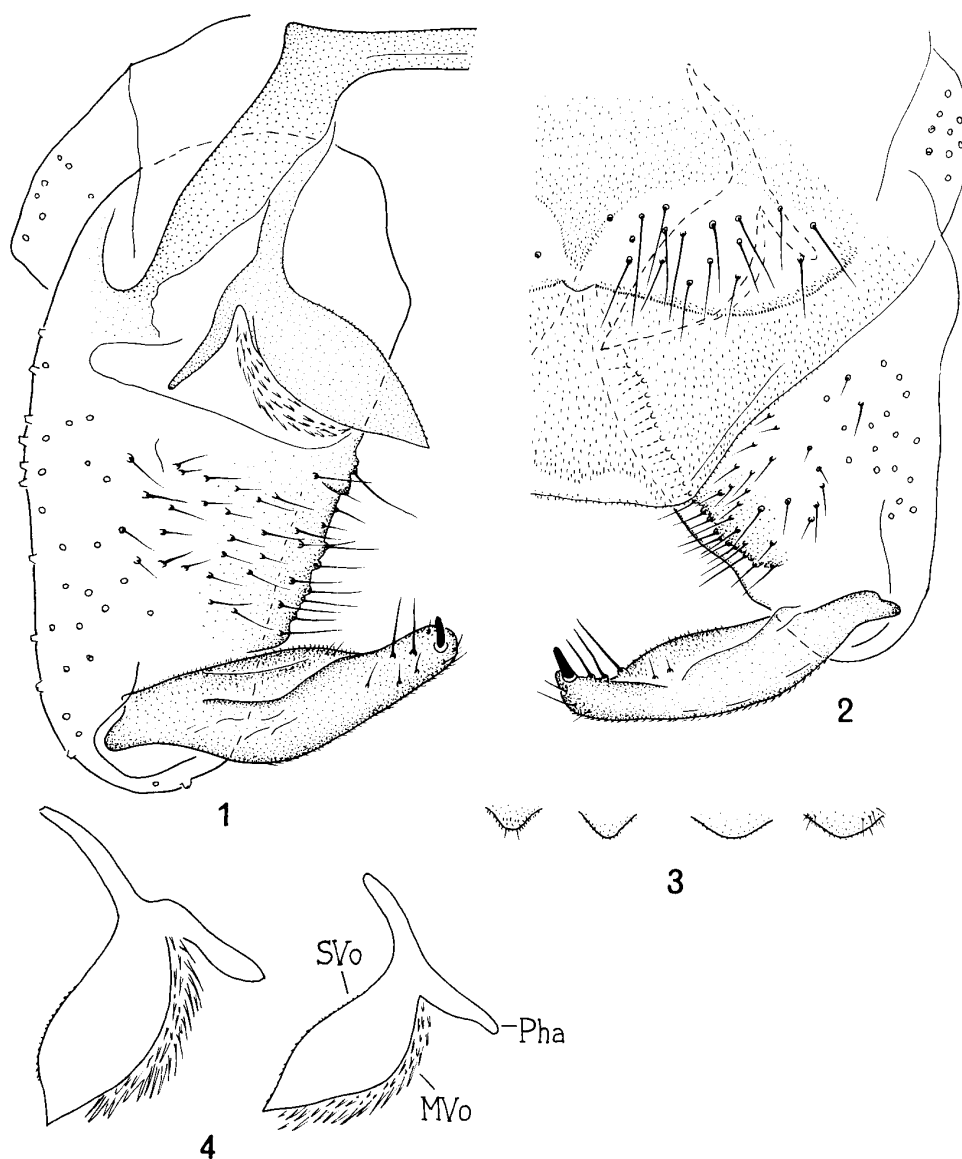
Larva of 4th instar. Length 7-11 mm. Head light-yellow with wide black post-occipital margin. Mentum yellow or smoky. Labrum with simple S-setae; SI like a leaf, with sharp top; SIII hair-like and SIV lanceolate. Labral lamellae (LL) of two broad, simple or slightly denticulate plates. Premandible usually dark brown or black in distal part, with 1-4 obtuse teeth. Mandible normal or sickle-shaped as in *Potthastia* spp. Mentum with one wide middle tooth, which is 6-7 times the width of the much darker first and 8-9 pairs of lateral teeth; some lateral teeth under semi-transparent ventromental plate. Procercus button-like, heavily sclerotized anally, height to width about one, and supporting 6-9 long anal setae and 1-2 small lateral setae.

Sympotthastia gemmaformis sp. nov.

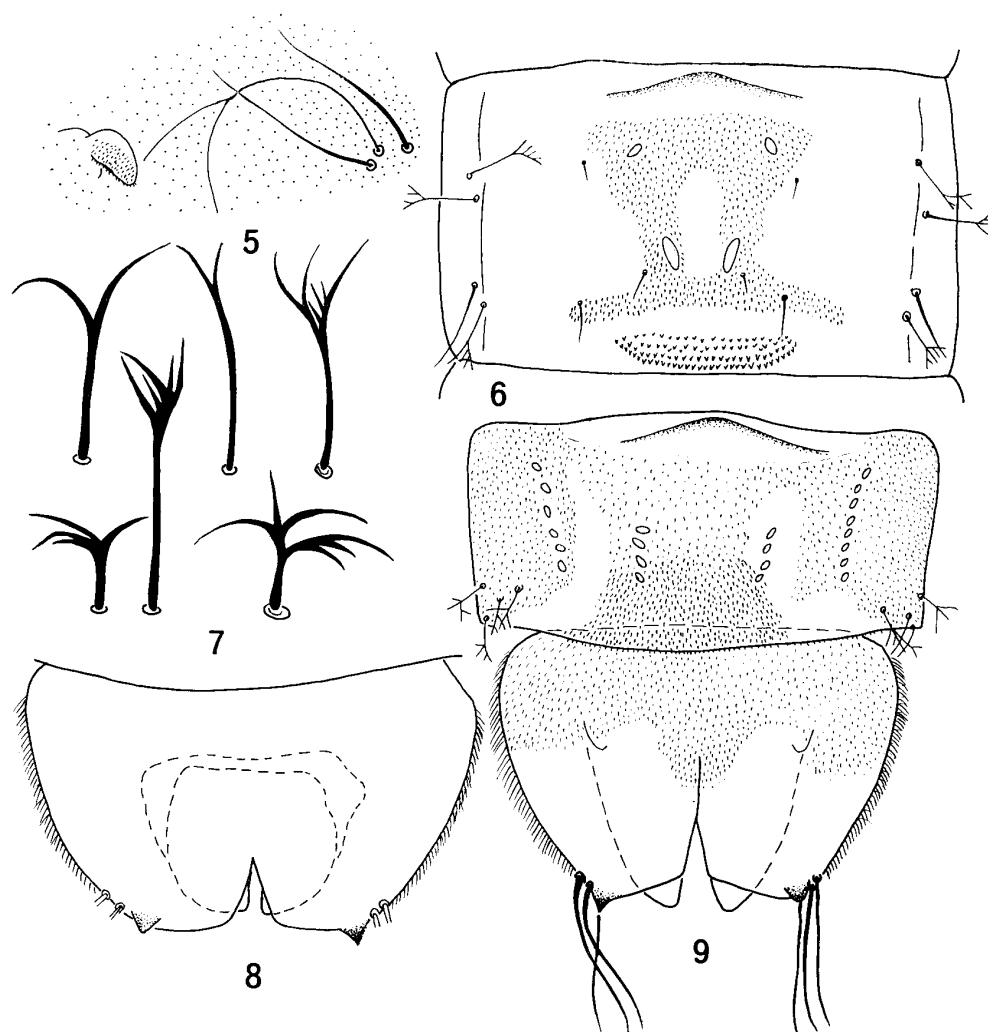
(Figs. 1–9)

Type localities: Japan, Hokkaido; Russia, Sakhalin.

Type material. Holotype: ♂, Bifue River, Chitose, Hokkaido, Japan, March 26, 1992, leg. T. ITO. Paratypes 2 ♂, extracted from mature pupae, 6 pupae, Pritornaya River (tributary of Nerpichya River), Poronaiksk Region, Okhotsk sea-coast, Sakhalin, May 15, 1975, leg. A. ZHULKOV. Holotype is deposited in the National Science Museum (Nat. Hist.), Tokyo. Paratypes are deposited in the Laboratory of



Figs. 1–4. Male of *Sympotthastia gemmaformis* sp. nov.; 1–2, hypopygium from Hokkaido (1) without tergite IX, dorsal view, and from Sakhalin (2); 3, anal points; 4, phallapodeme (Pha) with superior volsella (SVo) and median volsella (MVo).



Figs. 5–9. Pupa of *Sympotthastia gemmaformis* sp. nov.; 5, thoracal field with Pc-setae; 6, tergite III; 7, L-setae; 8, tergite IX, female; 9, tergites VIII–IX, male.

Freshwater Hydrobiology, Far Eastern Branch, Russian Academy of Sciences, Vladivostok, Russia.

Etymology. From Latin *gemmaformis* — reniform (of superior volsella of male hypopygium).

Description.

Male imago. Generally color dark brown, wings greyish, legs light brown. Body length 3.3 mm. Wing length 2.75 mm. Total length/wing length 1.2.

Head:— Coronals 4 (9.6–16 μm), postorbitals 19–26 (82.0–178 μm), preoculars 3–4 (118.4 μm), clypeals 11–17 (96 μm). Subapical seta of terminal antennal flagellomere length 36.3–46 μm . AR=3.0–3.4. Maxillary palps typical for *Sympotthastia*. Last 4 maxillary palpal segments length (μm): 99.2: 192: 278.4: 265.6. Head width/palp length: 0.93.

Thorax:— Anteprenotum with 9–12 ventrolateral setae (109.6 μm). Dorsocentrals 25–28 (110–247 μm), prealars 23–25 (151–206 μm), supraalars 0, scutellars 46.

Wing:— R and R_1 with 31 macrotrichia, R_{4+5} without setae. Squama dark grey, with numerous long setae in two rows.

Legs:— Front and hind legs with long setae, $BR_1=5.7$, $BR_2=3.4$, $BR_3=6$. Front tibial spur length 102.4 μm , middle tibial spurs length 54.4 and 57.6 μm , hind tibial spurs length 83.2 and 44.8 mm and with comb of 9 spines. Front ta_1 with 2 (41.5–48 μm) pseudospurs in subapical part, middle ta_1 with 11 (33.6–41.6 μm) pseudospurs, hind ta_1 with 13 pseudospurs. Length (μm) and proportions of legs:

P	fe	ti	ta_1	ta_2	ta_3	ta_4	ta_5	LR	SV	BV
P_1	1214	1448	1214	575	383	170	149	0.84	2.19	3.04
P_2	1214	1385	746	447	277	149	170	0.54	3.48	3.21
P_3	1427	1661	1044	575	362	170	170	0.63	2.96	3.24

Hypopygium (Figs. 1–4):— Tergite IX with 35–37 setae (67–83 μm) in two groups and with small tubercle-like anal point (Fig. 3). Laterosternite IX with 10–14 setae. Phallapodeme (Pha) length 155 μm ; superior volsella (SVo) length 221 μm , in distal part reniform, median volsella (MVo) spiniferous (Figs. 1, 4). Gonocoxite typical for the genus. Gonostylus ribbed, basal half wider than distal part, megaseta length 28–29 μm .

Pupa. Generally color brown or dark brown. Exuviae yellowish. Body length 5.3–5.9 mm ($\sigma\sigma$), 5.8–6.1 mm (♀♀). Length of Pc setae (μm): Pc_1 – 198, Pc_2 – 254, Pc_3 – 172. Thoracal horn reduced, like a small light-brown tubercle (Fig. 5). Tergite II with two, sometimes with three anal rows of small spines; tergite III with some rows of small spines, in front of these rows is a small spot of shagreen (Fig. 6). Tergites IV–VIII also with fields of tender shagreen. Segment I of male without L-setae, female with one pair of L-setae; segments II–III with three pair of ventral L-setae and one pair of dorsal L-setae. L3 setae of segments IV–V of male simple, other setae divided into 2–8 branches. Female with simple L3 on segment VI only. L-setae can be forked into some branches in distal 1/4 of middle part. L-setae of segment VIII situated in posterior corners; dorsal L-setae bifid, ventral L-setae forked into 3–7 branches (Fig. 9). Male gonopodal sacs extending a little beyond caudal margin. Fringe of hair-like setae of anal lobe 66–76 μm in length (Figs. 8–9).

Female and larva unknown.

Remarks. The adult male of *S. gemmaformis* sp. nov. is related to that of *S. repentina* but is readily distinguished from the latter by the reniform superior volsella and anal point. Pupa of the new species is close to that of *S. fulva* in L-setae.

Sympotthastia takatensis (TOKUNAGA), comb. nov.

(Figs. 10–13)

Syndiamesa takatensis TOKUNAGA, 1936, Philipp. J. Sci., **59**: 531; TOKUNAGA, 1937, 49. — GOETGHEBUER, 1939, 25. — SASA & KAWAI, 1985, 7–10, 1987, 69.

Sympotthastia khorensis MAKARCHENKO, 1984, Biol. Fresh Water, Vladivostok, DVNC AN SSSR Press, 91, 1985, 60–61.

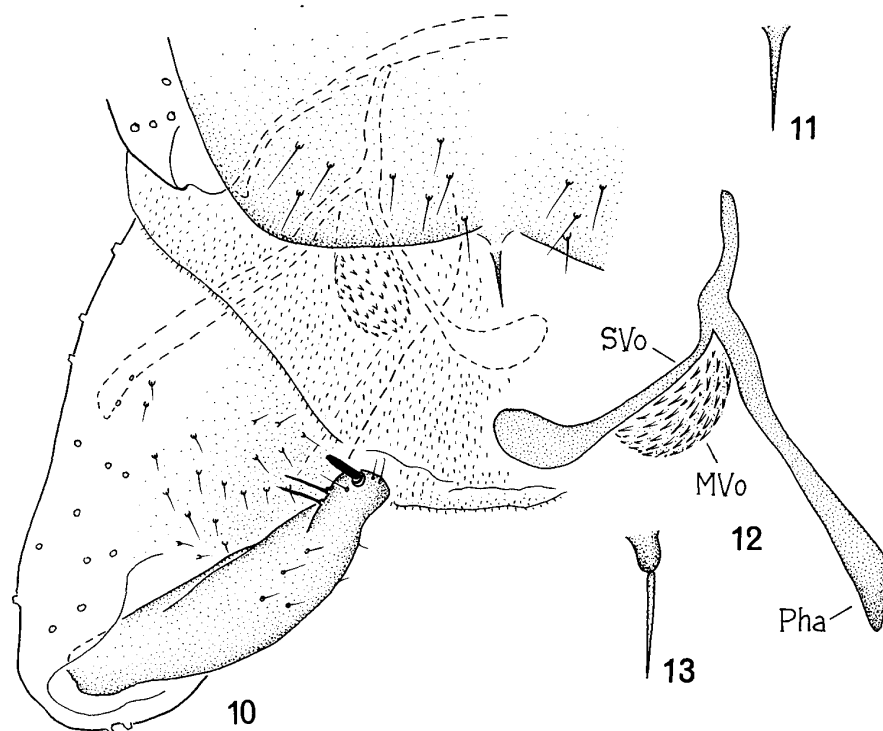
Material examined. ♂, Kawasaki City, Nihon Minka-En, Kanagawa, Prefecture, Japan, December 28, 1989, leg. T. KOBAYASHI; 2 ♂, Ishi River, Osaka, Kawachinagano, Takihata, Japan, April 11, 1990, leg. E. A. MAKARCHENKO.

Male hypopygium (Figs. 10–12). Tergite IX with 16–26 setae (49.5–82.5 μm) in two groups and spiniform anal point (39.6–56 μm) (Figs. 10–11). Laterosternite IX with 14–16 setae. Phallapodeme length 214.5 μm ; superior volsella length 221–228 μm , in distal part like a golf-club; median volsella spiniferous (Fig. 12). Gonocoxite typical for the genus. Gonostylus widest in about middle and narrowing towards apex, megaseta length 29.7–33 μm , two proximal setae length 39.6–42.9 μm .

Pupa and larva unknown.

Distribution. Japan: Honshu. Russia: Khabarovsk Region, Amur River basin; Primorye, Razdolnaya River.

Remarks. Male *S. takatensis* is very similar to the male of *S. huldeni* from Fin-



Figs. 10–13. Male of *Sympotthastia takatensis* from Japan (10–12) and Russia (13); 10, total view of hypopygium; 11, 13, anal points; 12, phallapodeme with superior and median volsellae.

land. Both the species have anal points and superior volsellae of the same form, but in the Finnish species, the median volsella is bare and the apical edge is finely serrated (TUISKUNEN, 1986). The median volsella of *S. takatensis* bear spinules on the surface. Also male *S. huldeni* has $AR=2.8$, male *S. takatensis* $AR=3.38-4.26$. It is possible that some populations of *S. takatensis* at the peripheries of distribution show geographical variability, and if the variation is continuous to *S. huldeni*, the latter may be regarded as a synonym of *S. takatensis*.

Hypopygium of males from Japan and the Amur River basin shows some variation, that is, the anal point of *S. takatensis* from Russia lies on a tubercle (Fig. 13).

Acknowledgements

I am much indebted to Dr. T. ITO of Hokkaido Fish Hatchery, Japan, Dr. T. KOBAYASHI of Kawasaki, Kanagawa Prefecture, Japan and Dr. A. ZHULKOV of the Sakhalin Branch of TINRO, Russia, for making the material available to me. This study was partly supported by the research fund of the Japan Society for the Promotion of Science.

References

- DOUGHMAN, J. S., 1985. *Sympotthastia* PAGAST (Diptera, Chironomidae), an update based on larvae from North Carolina, *S. diastena* (SUBLETTE) comb. n., and other Nearctic species. *Brimleyana*, **11**: 39–53.
- GOETGHEBUER, M., 1939. Tendipedidae (Chironomidae). c) Subfamilie Diamesinae. A. Die Imagines. In: LINDNER, E. (ed.), *Die Fliegen der Palaearktischen Region*, 28 pp.
- MAKARCHENKO, E. A., 1984. Two new species of *Sympotthastia* PAGAST (Diptera, Chironomidae) from south part of the Soviet Far East. In: *Biology of Fresh Water of the Far East*, 87–91. DVNC AN SSSR Press, Vladivostok. (In Russian.)
- 1985. Chironomids of the Soviet Far East. Subfamilies Podonominae, Diamesinae and Prodiamesinae. 208 pp. DVNC AN SSSR Press, Vladivostok. (In Russian.)
- OLIVER, D. R., 1983. The larvae of Diamesinae (Diptera, Chironomidae) of the Holarctic Region — Keys and diagnoses. *Ent. scand. Suppl.*, **19**: 115–138.
- 1986. The pupae of Diamesinae (Diptera, Chironomidae) of the Holarctic Region — Keys and diagnoses. *Ibid.*, **28**: 119–137.
- 1989. The adult males of Diamesinae (Diptera, Chironomidae) of the Holarctic Region. — Keys and diagnoses. *Ibid.*, **34**: 129–154.
- SAETHER, O. A., 1980. Glossary of chironomid morphology terminology (Diptera, Chironomidae). *Ent. scand. Suppl.*, **14**: 51 pp.
- SASA, M., 1989. Chironomidae of Japan: checklist of species recorded, key to males and taxonomic notes. *Res. Rept. natn. Inst. env. Stud. Japan*, (125): 1–177.
- & K. KAWAI, 1985. Morphological accounts on selected chironomids collected in Toyama. *Bull. Toyama Sci. Mus.*, (7): 7–22.
- & ——— 1987. Studies on the chironomid midges of the Stream Itachigawa, Toyama. *Ibid.*, (10): 25–72.
- SERRA-TOSIO, B., 1968. Taxonomie phylogénétique des Diamesini: genres *Potthastia* KIEFFER, *Sympotthastia* PAGAST, *Parapotthastia* n. g. et *Lappodiamesa* n. g. (Diptera, Chironomidae). *Trav. Lab.*

Hydrobiol. Grenoble, **59-60**: 117-164.

TOKUNAGA, M., 1936. Chironomidae from Japan. VI. Diamesinae. *Philipp. J. Sci.*, **59**: 525-552.

——— 1937. Family Chironomidae (1). *Fauna Nipponica*, **10** (7-1): 1-110.

TUISKUNEN, J., 1986. A new northern species of *Sympotthastia* (Diptera, Chironomidae). *Annls. ent. fenn.*, **52**: 78-80.